Huawei Cloud EI Redefine AI for the Intelligent World

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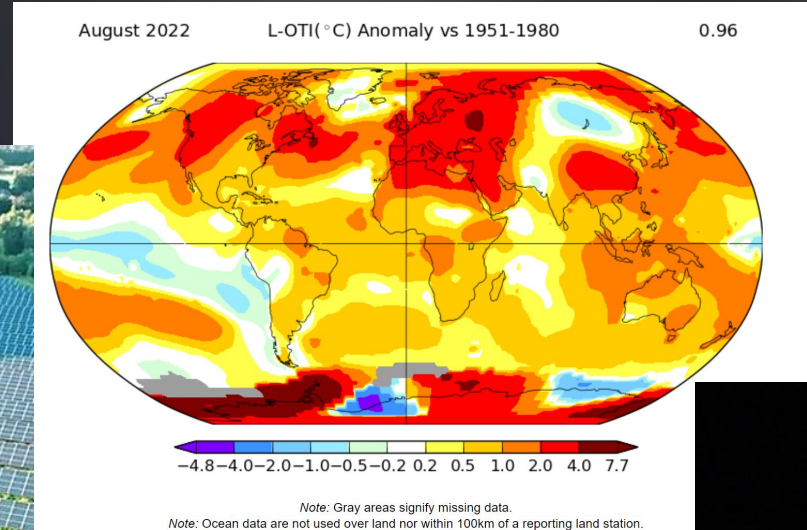
Agenda

- **AI Trends and Challenges**
- **Success Stories**

The global economy is under higher pressure

Major disruptions

Energy

Climate Change

Misinformation

Huawei Cloud's global AI and Data R&D deployment

Ireland
Video algorithm

Germany
S...

France
...athematics

Israel

Canada
...sion algorithms, interpretability, and security

...gorithm competence center,
...tion, data lake/data lineage, and
...g competence center

**Hong Kong,
Shenzhen, Beijing,
Shanghai, Hangzhou,
Xi'an, and Nanjing**

Singapore
Algorithms and security

Algorithm
• Deep learning
• Data mining
• Knowledge graph
• Cognitive computing

Data governance
• Data-AI convergence
• Data governance pipeline
• GaussDB(DWS)

Huawei Cloud

Compute power
• Ascend processor
• Kunpeng processor
• CPU/GPU

AI platform/ algorithm framework
• ModelArts
• MindSpore

No. 1
Ranking by patents

10%+
Employees with PhDs

15+
R&D centers in 4 continents

85+
Cooperation with global organizations

5,000+
R&D engineers

[M]ˢ MindSpore   APACHE CarbonData™

Top community contributor

**No. 1 in China's public cloud AI platform market according to IDC
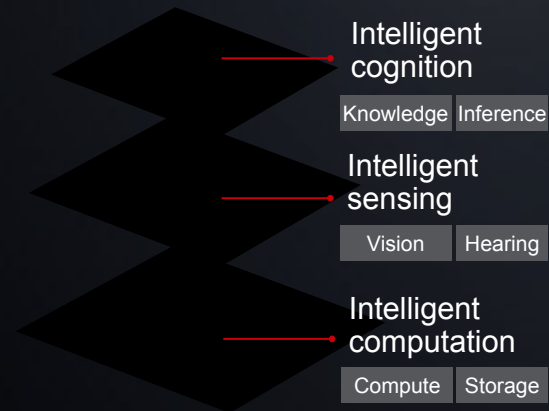And named in the Leaders quadrant by Forrester**

AI trends and challenges
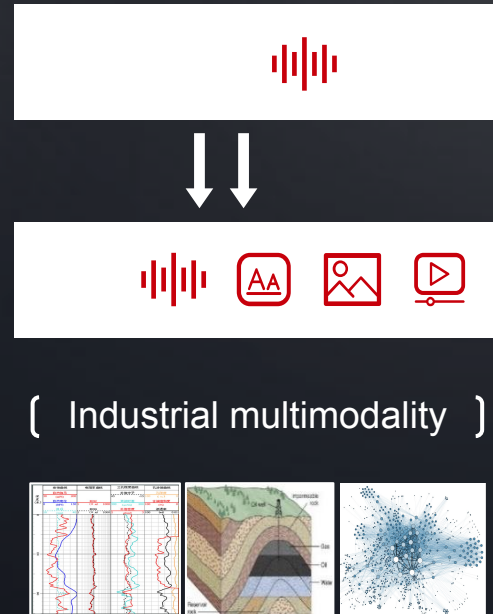
1. Knowledge computing

(From sensing to cognition)

Knowledge computing helps inject AI into core production systems, profitability and efficiency up by **18%+**.

— Seen in Huawei's 600+ projects

Intelligent cognition

| Knowledge | Inference |

Intelligent sensing

| Vision | Hearing |

Intelligent computation

| Compute | Storage |

2. Multimodality

(From unimodal to multimodal)
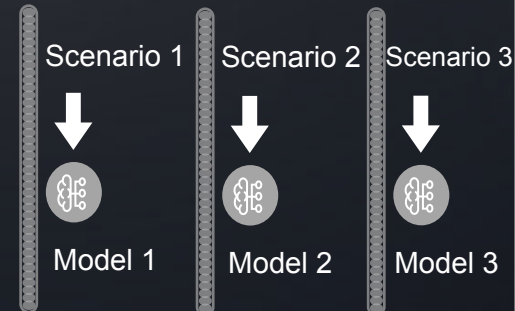
(Industrial multimodality)

3. Large models

(From isolated workshops to industrial development)

Data: **40+ TB**

Parameters: **100 billion**

Large pre-trained models

Generalization & replication

Scenario 1   Scenario 2   Scenario 3

Model 1   Model 2   Model 3

4. Device-cloud synergy

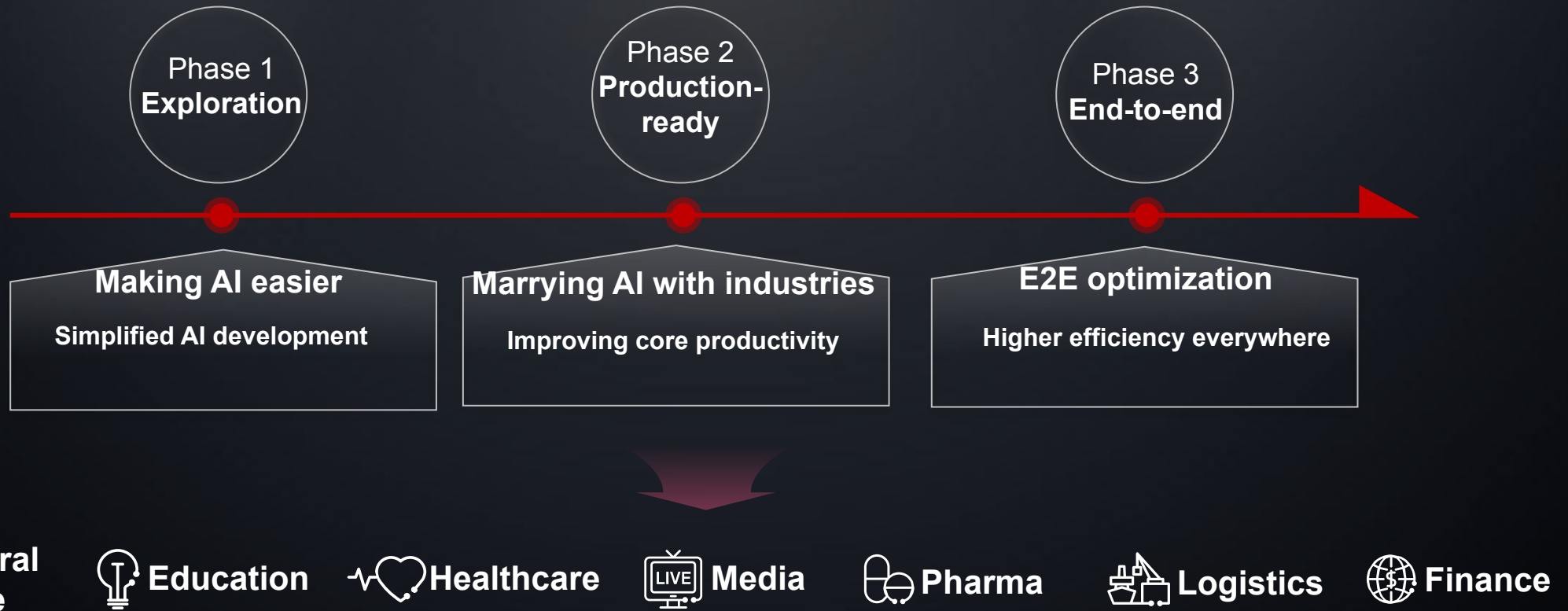(From cloud only to device-cloud synergy)

By 2023, the number of new, AI-capable OT devices deployed on the edge will grow by **50%**.
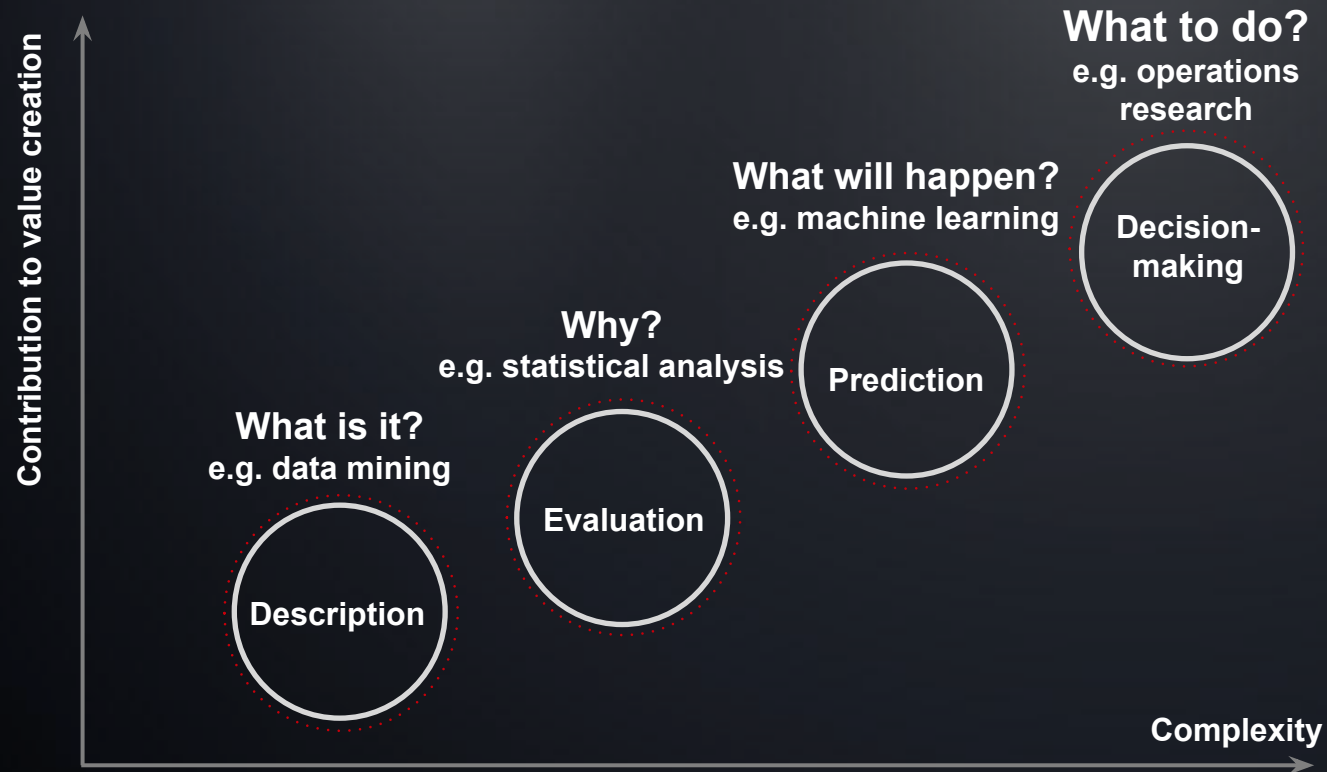
— From IDC

Device intelligence

Different phases of enterprise AI adoption

AI is now part of **core production systems** and creates concrete value

Phase 1
Exploration

Phase 2
Production-ready

Phase 3
End-to-end

Making AI easier

Simplified AI development

Marrying AI with industries

Improving core productivity

E2E optimization

Higher efficiency everywhere

General use   **Education**   **Healthcare**   **Media**   **Pharma**   **Logistics**   **Finance**

E2E optimization involves complex analysis and decision-making

Contribution to value creation (vertical axis)

What to do?
e.g. operations research

Decision-making

What will happen?
e.g. machine learning

Prediction

Why?
e.g. statistical analysis

Evaluation

What is it?
e.g. data mining

Description

Complexity (horizontal axis)

Challenges

Connecting and integrating different phases

Large-scale constraints

Connection between present and future variables

Resource convergence and consolidation

Source: Ideas and applications of optimization algorithms
(https://www.jiqizhixin.com/articles/2017-07-05, translated from Chinese to English)

Pangu Large Models landing in industries

L2

Identification of default risks
Identification of fraud motives
Financial anomaly detection

Cloth quality inspection
Drone inspection
Polarizer quality inspection

Fashion element labeling
Auxiliary design
Semi-customized stores

- - - - - - Workflows covering diagnosis, extraction, fine-tuning, and preprocessing

L1

Financial risk control
Industrial quality inspection
Stylish design
Case review
Smart breeding

L0

CV · NLP · Multimodal · Graph · Scientific computing

Pangu models

Workflow 2.0 · PRO workflows · Parallel inference framework · Preprocessing algorithms

ModelArts Studio

- 4000 V100 GPUs consumed annually
- 4 TB of cleansed plain text and 1 billion images for training
- 20 senior algorithm engineers
- 30 senior system engineers
- Huawei's years of algorithm and engineering capabilities
- Large pretrained models with hundreds of billions of parameters to fuel a variety of industries

Industry Cases

Huawei Southern Factory	Supreme People's Procuratorate
14%+ higher accuracy of quality inspection	50 times less labor costs
Shanghai Pudong Development Bank	**Assistant customer service**
One large model provides exception monitoring capabilities that previously provided by nine models	30% more sales
SGCC drone power inspection	**Drug R&D**
19% higher average precision	10 times shorter R&D cycle
Daikin	**Fashion copyright protection**
15% less power consumption	**20%** more accurate detection
GF Securities	**Conch Cement**
20% more accurate detection of financial anomalies	CNY30 million/year less energy consumption

Big Academic Large Models ☐ industrial large Models

Academic Large Models
In terms of architecture, modal unification, and evaluation system, Pangu leads the core innovation capabilities of large models.
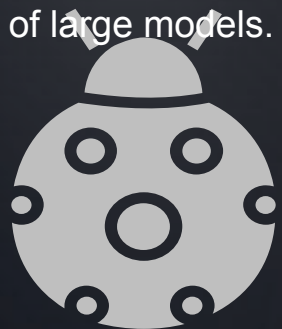
Industrial Large Models
Relying on HUAWEI's engineering capabilities and accumulated industry experience to build Pangu's unique competitiveness.

Make it fat——Building L0 root tech competitiveness

1. Architectural innovation, training efficiency improvement, from multi-task unified development to multi-modal unified development, accuracy improvement.
2. Few shot/zero shot improvement
3. Leading industry's evaluation standard and enables the model to iteratively evolve rapidly.

Put feet on it ——Industry knowhow, tool chains, platforms technoletc.

1. Reduce training cost from L0☐L1 and improve inference efficiency.
2. Introducing domain knowledge to improve accuracy.
3. Using automated tool chain speeds up model iteration and accumulates industry experience. At the same time, lower the threshold of AI development for industry experts.

Solvers can help industries find the optimal solutions

R&D	Supply chain	Procurement	Manufacturing	Marketing	Sales	Service	Finance	HR
Design	Resource scheduling	Procurement plan	Material allocation	Marketing budget	Better user experience	Better user experience	Better investment	Personnel optimization
Simulation	Production planning/scheduling		Geometric optimization	Better user experience	Planning	Site selection		
Calculation	Path optimization		Process optimization		Pricing	Resource scheduling		
Optimization	Inventory optimization							
	Logistics							

Optimal decision-making

Resource utilization ⬆   Operational efficiency ⬆   Benefits ⬆   Costs ⬇

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Applying OptVerse AI Solver to specific industry scenarios

Smart City **Transportation** **Energy** **Supply chain** **Finance** **Manufacturing**
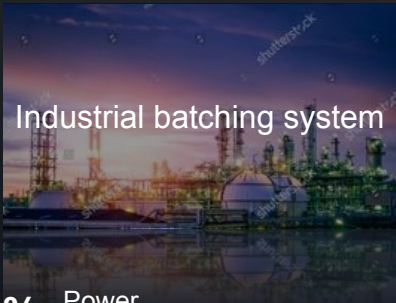
↑ **15%** Risk-benefit ratio   ↑ **30x** Higher efficiency   ↑ **37%** Inventory completeness   **2.6 million** fewer passengers ferried across the tarmac   ↑ **15%** Equipment utilization
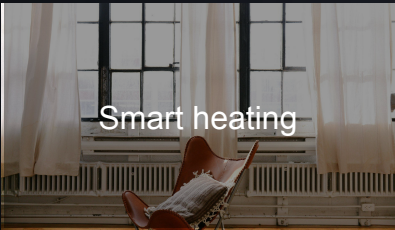
Financial investment   Industrial batching system   Production planning   Airport stand allocation   Port planning
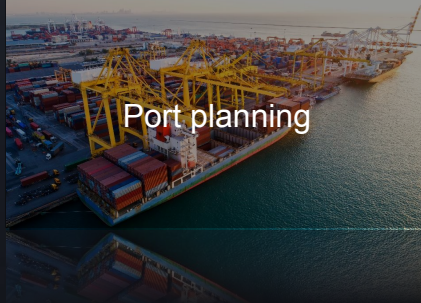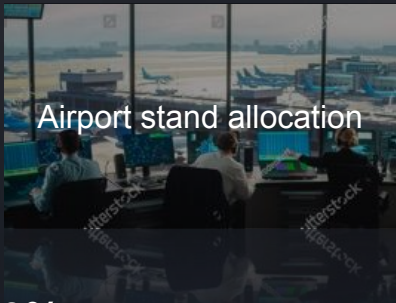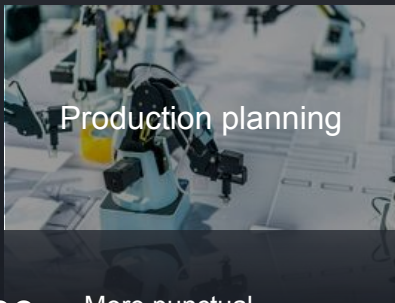
↓ **10%** Power consumption   ↑ **33%** More punctual delivery   ↑ **3%** Higher plate utilization

Smart heating   E-commerce order management   Cutting

Huawei Cloud Pangu CV Large Model leverage in power line inspection scenarios

Tower Tilt

HUAWEI CLOUD

Wildfire

Icing

Micrometeorological

Enterprise intelligence is widely used in Intelligent upgrades of electric power industries

During intelligent inspection of power line with UAVs, the UAVs send back **50,000** photos every day. The images need to be analyzed using the computer vision technology to identify defects smartly

Massive UAV data needs to be processed

Various types of defects (100+) | Millions of images | Small proportion of defective samples

Pin missing

Conductor icing

Wildfire

Crane under the powerline

Missing stockbridge damper

Toppled tower

Viewing Defect Types

The power grid company has 45 substations, more than 1,600 km of transmission lines, and more than 5,000 km of distribution lines

Power transmission line inspection in action

Manual inspection

Thank you.

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HUAWEI